

AF/2826-8

PATENT

Case Docket No. MICRON.240A

Date: March 29, 2004

Page 1

In re application of : Ammar Derraa et al.
Appl. No. : 09/944,903
Filed : August 30, 2001
For : HIGH ASPECT RATIO
CONTACT STRUCTURE
WITH REDUCED
SILICON
CONSUMPTION
Examiner : Victor A. Mandala
Art Unit : 2826

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March 29, 2004

(Date)

Linda H. Liu, Reg. No. 51,240

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Transmitted herewith in triplicate is an Appellants' Brief (including Appendix of claims and 3 cases cited in Brief) to the Board of Patent Appeals:

- (X) Fee for filing brief in the amount of \$330 is enclosed.
- (X) A check in the amount of \$330.00 to cover the foregoing fees is enclosed.
- (X) If applicant has not requested a sufficient extension of time and/or has not paid any other fee in a sufficient amount to prevent the abandonment of this application, please consider this as a Request for an Extension for the required time period and/or authorization to charge our Deposit Account No. 11-1410 for any fee which may be due. Please credit any overpayment to Deposit Account No. 11-1410.



PATENT

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Registration No. 51,240

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PATENT

Applicant : Ammar Derraa
 Appl. No. : 09/944,903
 Filed : August 30, 2001
 For : HIGH ASPECT RATIO
 CONTACT STRUCTURE WITH
 REDUCED SILICON
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(Date) _____
Linda H. Liu, Reg. No. 51,240

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicant, in the above-captioned patent application, appeals the rejection of Claims 1-9 which were rejected in the Office Action mailed October 29, 2003. This appeal brief is filed in triplicate.

The real party in interest is Micron Technology, Inc..

No appeal or interferences related to this case is currently pending.

Claims 1-9 are pending and are appealed.

Claims 10-18 are canceled.

Claims 19-26 have been restricted out.

No amendments have been filed subsequent to the rejection noted in the Office Action mailed October 29, 2003.

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V. SUMMARY OF THE INVENTION

The present invention concerns an integrated circuit having a contact structure comprising a titanium-based conductive contact configured to reduce consumption of silicon from the substrate during a subsequent silicidation reaction between titanium in the conductive contact and silicon in the substrate, which is summarized at page 3 line 25 to page 4, line 3 and page 4 lines 16-21. The conductive contact is preferably a titanium layer interspersed with titanium silicide that is directly deposited in an opening formed in the contact structure. Page 4, lines 10-14. Preferably, the conductive contact has about 10% silicon interspersed in the titanium layer. Page 4, lines 12-14. The contact structure further includes a contact fill that is deposited over the conductive contact to conform to the contours of the opening and provide improved step coverage, particularly for high aspect ratio contact openings. Page 9, Lines 24-29. The Ti/TiSi_x conductive contact in combination with the TiN contact fill are particularly suitable in providing superior coverage for high aspect ratio contact openings formed over shallow junction regions.

VI. ISSUES PRESENTED ON APPEAL

The following issues are presented:

Whether claims 1, 4-5, & 7-8 are properly rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,312,774 to Nakamura et al.

Whether claims 2-3, 6, & 9 are properly rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,312,774 to Nakamura et al.

VII. GROUPING OF THE CLAIMS

In the present case, the rejected claims do not all stand or fall together. Applicant submits that each claim presents distinct issues concerning patentability. In the interest of administrative economy and efficiency, however, Applicant agrees to narrow the issues for the purpose of this appeal by grouping the claims as follows:

GROUP 1: Claims 1-3, 5 and 8-9 which relate generally to an integrated circuit having a conductive contact comprising a titanium layer interspersed with titanium silicide and a contact fill deposited thereon, the contact fill comprising titanium nitride. The titanium silicide is interspersed in the titanium layer to reduce the total amount of silicon consumed from the

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substrate in a silicidation reaction between titanium in the conductive contact and silicon in the substrate.

GROUP 2: Claims 4, and 6-7 which are directed generally to the same subject matter as Claims 1-3 and 8-9 but which relate to a high aspect ratio contact structure, preferably greater than 10:1, formed over a shallow junction region. The contact structure has a conductive contact comprising titanium interspersed with titanium silicide that is deposited in sufficient quantities to reduce consumption of silicon from the shallow junction region. The contact structure further includes a titanium nitride contact fill that is formed over the conductive contact and provides thorough step coverage of the high aspect ratio contact opening.

VIII. ARGUMENT

A. The Reference Cited By the Examiner Does Not Teach a Contact Structure Having a Ti/TiSi_x Conductive Contact Deposited in a Contact Opening To Reduce Silicon Consumption in the Substrate During a Subsequent Silicidation Reaction and a TiN Contact Fill Deposited on the Conductive Contact to Fill the Contact Opening with improved step coverage.

Applicant claims an integrated circuit contact structure having a conductive contact made of a titanium layer interspersed with titanium silicide and is deposited in sufficient quantities in the contact opening so as to reduce silicon consumption from the substrate. Applicant further claims the contact structure as having a titanium nitride contact fill that is formed *on* the conductive contact in a manner so as to conform to the contours of high aspect ratio openings. U.S. Patent No. 5,312,774 to Nakamura, et al. cited by the Examiner does not disclose such an invention.

In the Office Action dated October 29, 2003, the Examiner indicated that the pending application is anticipated by Nakamura. However, nowhere in Nakamura et al. does it teach or suggest such a contact structure having the *combination* of a conductive contact comprising titanium interspersed with titanium silicide *and* a titanium nitride contact fill *formed thereon*. Nakamura is only directed to forming a titanium or titanium compound film onto a substrate using a CVD method. The method involves using an organic titanium compound as a material gas for forming the film. (See, e.g., Col. 2, Lines 46-68 of Nakamura) The titanium compound contains one or more organic groups such as a lower alkyl group, a C₈₋₁₃ condensed polycyclic hydrocarbonyl group, or a silyl group. The organic group(s) must be decomposed through a

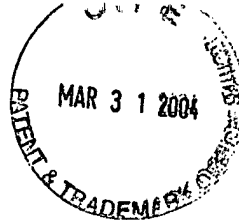
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sublimation process after deposition with heat of the substrate. Nakamura provides an example which discloses the formation of a titanium silicide layer by depositing the organic titanium compound in conjunction with a disilane reducing gas. (Col. 6, Lines 15-67) However, Nakamura only describes the formation of a titanium silicide layer and does not teach or suggest the formation of *a titanium layer interspersed with titanium silicide* in sufficient quantities to reduce the consumption of silicon from the substrate in a subsequent silicidation reaction.

Nakamura also does not disclose a titanium nitride contact fill formed on the conductive contact to provide better step coverage for high aspect ratio contact structures. While the Examiner asserted that Figure 2 of Nakamura discloses Applicant's invention, Applicant notes that Figure 2 of Nakamura does not show a TiN contact fill formed in the contact opening. Instead, the contact structure in Figure 2 shows a Ti plug having its upper surface nitridized to form a thin layer of TiN. The TiN layer does not fill the contact opening nor does it contact the TiSi_x conductive contact layer. As such, the Nakamura reference does not disclose each and every feature recited in Claim 1 of the pending application. Thus, Applicant submits that Claim 1 is not anticipated by Nakamura.

The Examiner also indicated in the Oct. 29 Office Action that Applicant's invention is obvious in light of Nakamura. However, the mere fact that a reference can be modified to include the limitations of the present invention does not make the modification obvious unless the prior art suggested the desirability of the modification. *See In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) The Examiner has produced no prior art suggesting that the method disclosed in Nakamura can be modified to produce a contact structure having *both* a Ti/TiSi_x conductive contact and a TiN contact fill thereon that provides improved step coverage for high aspect ratio contact openings. In fact, Applicant notes Nakamura appears to teach away from forming a high aspect ratio contact structure. Although the Examiner argued that Nakamura also discloses a contact opening having an aspect ratio of at least 10:1 and cited Col. 4 Lines 32-33 for support, Applicant disagrees with the Examiner's conclusion. After carefully reviewing the cited sections, Applicant notes that Col. 4 Lines 32-33 of Nakamura actually discloses that "examples of the contact hole may be formed 0.6-1.0 μm in height and 0.3-1.0 μm in width" which is likely to result in an aspect ratio much less than 10:1. As such, there would have been no motivation for one of ordinary skill in the art to apply the teachings of Nakamura to form a contact structure

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comprising a titanium nitride contact fill deposited on a titanium interspersed with titanium nitride conductive contact and configured for high aspect ratio contact holes as claimed by Applicant. As the Federal Circuit has noted, a Section 103 rejection is improper if the "prior art of record fails to provide any such suggestion or incentive. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577 (Fed. Cir. 1984). Applicant further notes that "it is error to reconstruct the patentee's claimed invention from the prior art by using the patentee's claim as a blueprint." *Interconnect Planning Corp. v. Feil*, 227 USPQ 543 (Fed. Cir. 1985)

In summary, the art cited by the Examiner fails to teach a contact structure as claimed by Applicant as the reference does not teach or suggest the formation of a contact structure having a Ti/TiSi_x conductive contact and a TiN contact fill formed thereon, particularly to improve step coverage of high aspect ratio contact structures. As a consequence, Applicant respectfully submits that that Claim Group I (Claims 1-3, 5, and 8-9) and Claim Group II (Claims 4 and 6-7) are not anticipated by or made obvious by the reference cited by the Examiner.


B. Conclusion

Nothing in the prior art discloses, teaches or suggests the invention recited by the claims of Applicant's disclosure. Furthermore, the art recited by the Examiner fails to supply any motivation or suggestion to apply the reference in the manner suggested by the Examiner. Applicant respectfully submits that the claimed invention is patentably distinct over the prior art. In view of the foregoing, Applicant requests that the rejection of Claims 1-9 be reversed.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 3/29/2004

By: 
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APPENDIX

1. An integrated circuit, comprising:
 - a silicon substrate;
 - an insulating layer formed on an upper surface of the substrate wherein a contact opening is formed in the insulating layer, wherein the contact opening extends from an upper surface of the insulating layer to the upper surface of the substrate;
 - a conductive contact deposited in the opening in a manner such that the conductive contact directly contacts the upper surface of the substrate, wherein the conductive contact comprises a titanium layer interspersed with titanium silicide, wherein a substantial portion of the titanium silicide is interspersed in the titanium prior to the depositing in the opening such that the substantial portion of titanium silicide reduces the total amount of silicon from the substrate consumed in forming titanium silicide in the conductive contact;
 - a conductive contact fill formed on an upper surface of the conductive contact, wherein the conductive contact fill comprises titanium nitride.
2. The integrated circuit of Claim 1, wherein the titanium layer interspersed with titanium silicide is approximately 50Å to 150Å thick.
3. The integrated circuit of Claim 1, wherein the titanium layer interspersed with titanium silicide comprises approximately 10 % silicon.
4. The integrated circuit of Claim 1, wherein the contact opening has an aspect ratio of at least 10:1.
5. The integrated circuit of Claim 1, wherein the upper surface of the substrate comprises a junction region.
6. The integrated circuit of Claim 5, wherein the junction region is less than about 1µm deep.
7. The integrated circuit of Claim 5, wherein the titanium silicide in the titanium layer provides low resistance electrical contacts between the junction region and the silicon substrate.
8. The integrated circuit of Claim 1, wherein the titanium rich titanium silicide layer is deposited over the upper surface of the insulating layer.
9. The integrated circuit of Claim 1, wherein the titanium nitride contact fill comprises a TiCl₄ based titanium nitride.

Standard of Review

[1] "[O]bviousness is a question of law to be determined from the facts."⁵ The obviousness determination "is based upon underlying factual inquiries concerning the claimed invention and the prior art" which are reviewed for clear error.⁶ However, it is the ultimate conclusion of obviousness which the Federal Circuit reviews as a matter of law.⁷

Teachings of Wilson

Fritch takes exception to the Examiner's findings of fact related to the teachings of the Wilson patent. The Examiner's rejection and the Board's opinion rely heavily on the use of Wilson in view of other references to declare the Fritch invention obvious. The Board states that it agrees with the Examiner's finding of fact regarding the teachings of Wilson. In the Examiner's answer, which the Board quotes, the Wilson device is described as follows:

Wilson discloses a landscaping edging strip comprising a relatively thin gauge, elongated flexible base portion including a mower strip B having a planar bottom surface conformable to a varying slope surface.

The Board states that the Wilson reference presents "substantial evidence that Wilson is both thin and flexible." The Board regards the Wilson device as teaching that it is flexible and conformable in its entirety. This finding demonstrates clear error.

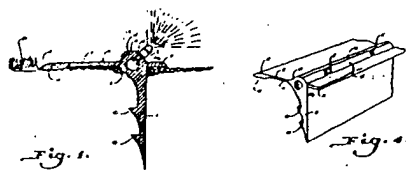
[2] It is well settled that a prior art reference is relevant for all that it teaches to those of ordinary skill in the art.⁸ The base portion of Wilson is not planar in its entirety, as the Board's opinion suggests, but also includes a prominent anchoring leg to secure the device to the ground. The anchoring leg, which runs the length of the Wilson device, would inhibit longitudinal flexibility of the Wilson device. Indeed, Wilson expressly contemplates flexibility and conformability *only* in the mower strip. Wilson states that its mower strip may be lifted in order to pack dirt thereunder for the purpose of securing the device to the ground. Fritch, on the other hand, is claimed to be flexible in its entirety.

⁵ *In re De Blauwe*, 736 F.2d 699, 703, 222 USPQ 191, 195 (Fed. Cir. 1984).

⁶ *In re Kulling*, 897 F.2d 1147, 1149, 14 USPQ2d 1056, 1057 (Fed. Cir. 1990).

⁷ *In re De Blauwe*, 736 F.2d at 703, 222 USPQ at 195.

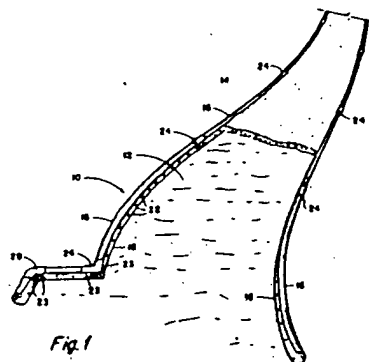
⁸ *Beckman Instruments Inc. v. LKB Produkter AB*, 892 F.2d 1547, 1551, 13 USPQ2d 1301, 1304 (Fed. Cir. 1989).



b. The Hendrix Patent

The Hendrix patent is entitled "Loose Material Retainer Strip".⁴ The Solicitor chose not to discuss the Hendrix reference in his brief, stating that the Board had deemed Hendrix unnecessary to its decision. The Solicitor overstates the Board's position. The Board based its decision upon "a collective evaluation of the Wilson and Hendrix patents". We include Hendrix in our discussion because it did play a role in the rejection of Fritch's independent claims.

The Hendrix device is composed of elongated, flexible strips having substantially C-shaped cross-section. The bottom lip of the device is to be wider than the top lip in order to facilitate fastening the device to the ground. The device will fit most gentle contours, and the top lip will yield laterally to build-up of gravel until the gravel can be redistributed. The concave portion of the strip is installed such that it faces the material to be retained in place. Hendrix contemplates that the retainer will be used in retaining gravel in driveways, lining flower beds, or on the shoulders of asphalt or concrete highways. Figure 1 of Hendrix's drawings is reproduced below:



⁴ U.S. Patent No. 4,349,596.

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⁹ *In re Pic*
USPQ 785,
¹⁰ *In re Fir*
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¹¹ *In re He*
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736 F.2d 699, 703, 222
 Cir. 1984).

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 Fed. Cir. 1990).

, 736 F.2d at 703, 222

ents Inc. v. LKB Pro-
 1547, 1551, 13 USPQ2d
 1989).

The Board's holding that Wilson is flexible in its entirety is based upon a misapprehension of the scope of Wilson's teachings.

Second, Wilson's anchoring leg prohibits conformability to the ground surface in the manner claimed by Fritch. The Examiner's description of Wilson as having a "planar bottom surface conformable to a varying slope surface" is applicable *only* in reference to the mower strip. This description, however, ignores the anchor leg and the fact that it must be placed *into* the ground. Wilson expressly teaches that the anchoring leg may be pushed into soft soils, but in harder terrain a trench is needed in order to place the Wilson sprinkler system. In order to install the Wilson apparatus, the ground surface must be altered to conform to the device rather than, as the Solicitor contends, that Wilson is freely conformable to the ground. Fritch, on the other hand, does not require such extensive alteration of the ground surface in order to install the device.

Prima Facie Obviousness

In proceedings before the Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art.⁹ "[The Examiner] can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references."¹⁰ The patent applicant may then attack the Examiner's prima facie determination as improperly made out, or the applicant may present objective evidence tending to support a conclusion of nonobviousness."¹¹

Fritch has attacked the Board's finding that the Examiner established that Fritch's claimed invention was prima facie obvious in view of the teachings of the prior art. The Board states that "a collective evaluation of the Wilson and the Hendrix patents would have rendered the subject matter of independent claims 1, 13, 24, and 29 obvious to one of ordinary skill." Fritch maintains that there is no teaching, suggestion, or incentive in the prior art to modify or to combine the

teachings of the prior art in the manner suggested by the Examiner. We agree.

[3] Wilson teaches a grass edging and watering device which includes an anchoring leg for securing the device to the ground. Wilson contemplates that a trench will need to be dug in order to allow the anchoring leg to be placed into the ground if the condition of the soil requires it. This anchoring leg prohibits flexibility and conformability over the length of Wilson. Any flexibility or conformability in Wilson, which the Board states extends to the entire device, is limited to the mower strip. It is only the mower strip that is mentioned as being flexible in order to aid installation. Hendrix has been cited for its teaching of a flexible retainer strip that is able to conform to the ground surface.

Wilson addresses the problems of arresting growth of grass between areas and watering plants without wetting sidewalks. Wilson lacks any suggestion or incentive to use its water conduit as a landscape retainer since this would arguably result in clogged sprinkler heads.¹² Wilson also teaches that its mower strip is flexible in order to allow dirt to be packed thereunder. There is no suggestion in Wilson to extend that flexibility to the entire device. Wilson also lacks any teaching or suggestion that one should remove the anchoring leg. Hendrix does not, simply by virtue of its flexible nature, suggest these extensive changes which the Board states are obvious. Neither Wilson nor Hendrix, alone or in combination, provide any incentive to combine the teachings of the prior art in the manner maintained by the Board.

[4] "Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined *only* if there is some suggestion or incentive to do so."¹³ Although couched in terms of combining teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested

⁹ *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir. 1984).

¹⁰ *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988) (citing *In re Lulu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1988)).

¹¹ *In re Heldt*, 433 F.2d 808, 811, 167 USPQ 676, 678 (CCPA 1970).

¹² This court has previously found a proposed modification inappropriate for an obviousness inquiry when the modification rendered the prior art reference inoperable for its intended purpose. *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

¹³ *ACS Hosp. Systems, Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984).

GIES sound much e, especially if (as s and to the TTAB) ; if derived from the ilarity in sound is his instance because its radio and televi- ongly stressed the JGGIES.

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nly favoring HDE is of actual confusion.

IES was in fact drawn chief figure in appellee in Douglas:

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in the TTAB proceed say that its mark had is no doubt that appel- ence on, and strongly ation," "well-known" istic of its mark HUG : facts.

Appellee insists that we should also count for it the fact that its trade dress is different from that of HUGGIES. It is settled, however, that a distinction in trade dress cannot weigh against likelihood of confusion with respect to the registration of a simple word mark like DOUGIES. The reason is that such dress might well be changed at any time; only the word mark itself is to be registered. *Vorando, Inc. v. Breuer Electric Mfg. Co.*, 390 F.2d 724, 727, 156 USPQ 340, 342 (CCPA 1968). Accordingly, HDE's strong reliance on *Quaker Oats Co. v. General Mills*, 134 F.2d 429, 56 USPQ 400 (7th Cir. 1943), is misplaced. That pre-Lanham Act decision did not at all involve registration of the mark "Oaties" (registration had in fact been denied) but solely differences in packaging and trade dress as against "Wheaties."

III.

[1] The upshot of our own appraisal of the pertinent factors is that there is indeed a likelihood of confusion with K-C's mark HUGGIES. We are not loath to reach this conclusion because of the teaching of our predecessor court — recently reiterated by this court — that there is "no excuse for ever approaching the well-known trademark of a competitor" and "that all doubt as to whether confusion, mistake, or deception is likely is to be resolved against the newcomer, especially where the established mark is one which is famous and applied to an inexpensive product bought by all kinds of people without much care." *Planter's Nut & Chocolate Co. v. Crown Nut Co.*, 305 F.2d 916, 924-25, 134 USPQ 504, 511 (CCPA 1962). To the same effect, see *Specialty Brands, supra*, 748 F.2d at 676, 223 USPQ at 1284. We therefore reverse the decision of the TTAB dismissing K-C's opposition.

REVERSED.

¹ Belatedly; appellee argues that "HUGGIES" is descriptive but this separate defense was not raised in its pleadings or briefs below. Only the unlikelihood of confusion was raised against HUGGIES.

² Reverend Douglas, principal in HDE, testified that he was aware of the HUGGIES mark before he adopted DOUGIES.

Court of Appeals, Federal Circuit

Interconnect Planning Corporation v. Feil, et al.

Nos. 84-1467 and 85-565

Decided October 9, 1985

PATENTS

1. Estoppel — As to validity — In general (§35.151)

Federal district court decision on patent validity, which was not final, not certified, not appealed, and mooted by subsequent events, does not collaterally estop appeal of those aspects of subsequent decision on reissue of patent which are "common to" earlier decision, since current appeal involves validity of claims of reissue patent, which was issue that did not exist at time of decision on validity of original patent claims.

2. Patentability — Anticipation — In general (§51.201)

Reissue — In general (§58.1)

Patent's reissuance with claims that are not substantially identical to original claim requires evaluation of invention as whole, as currently claimed, in terms of 35 USC 103, and original claims, whether valid or invalid, are not prior art against reissued claims.

3. Patentability — Aggregation or combination — In general (§51.151)

Federal district court erred by treating each prior art reference as teaching one or more of specific components for use in claimed system, even though such system did not then exist.

Particular patents — Telephone Switches

Re. 31,144, Feil, Multi-Station Telephone Switching System, holding of invalidity vacated.

Appeal from District Court for the Southern District of New York, Duffy, J.; 223 USPQ 961.

Action by Interconnect Planning Corporation, against Thomas E. Feil, Robert O. Carpenter, V Brand, Inc., and Turret Equipment Corp.,* for patent infringement and unfair competition, in which defendants counterclaim

* The complaint against Robert O. Carpenter and Turret Equipment Corp. was dismissed by stipulation, and they are not parties to this appeal.

for declaration of patent invalidity. From decision granting defendants' motion for summary judgment, plaintiff appeals. Vacated and remanded.

Alfred P. Ewert, and Morgan, Finnegan, Pine, Foley & Lee, both of New York, N.Y. (Jerome G. Lee, Robert A. Molan, and Richard J. McGrath, on the brief, and Howard Karasik, and Sherman & Citron, P.C., both of New York, N.Y., of counsel) for appellant.

Lawrence G. Kurland, and Hubbell, Cohen, Steifel & Gross, P.C., both of New York, N.Y. (Lance J. Lieberman, Daniel L. Dolgin, Towne, Dolgin, Sawyer & Horton, Peter P. Stern, Theodore S. Steingut, and Berger, Steingut, Weiner, Fox & Stern, all of New York, N.Y., on the brief) for appellees.

Before Davis, Smith, and Newman, Circuit Judges.

Newman, Circuit Judge.

Interconnect Planning Corporation (IPC) appeals from the summary judgment of the United States District Court for the Southern District of New York, *Interconnect Planning Corp. v. Feil*, 587 F.Supp. 1495, 223 USPQ 961 (S.D.N.Y. 1984), holding invalid all the claims of IPC's Reissue Patent No. 31,144 entitled "Multi Station Telephone Switching System," invention of Thomas E. Feil, for failure to meet the conditions for patent validity under 35 U.S.C. § 103, and dismissing IPC's count for patent infringement. We hold that invalidity under § 103 has not been proven, as a matter of law. We vacate the summary judgment of invalidity and dismissal of the infringement count, and remand to the district court.

Background

The claims of Reissue Patent No. 31,144 are for certain telephone systems known as "trader turrets", which are multi-line telephone consoles used by the financial community in trading networks for securities, commodities, currency, and the like. The purpose of these systems is to facilitate concurrent telephone connections for traders requiring multiple sources of price information, conducting multiple transactions, and generally meeting the communication demands of busy, often hectic, financial trading enterprises. Trading rooms may house a hundred or more trader turrets.

Because of the large number of lines and connections required and the specific needs of these communication networks, these systems are complex. A high degree of reliability is required in their operation, because even momentary failures can be extremely costly.

The record shows that the Feil trader turrets rapidly achieved commercial success, displacing other systems then in use. IPC attributes the success of the Feil invention to its novel system "architecture", which enabled ease of operation, high capacity, and improved reliability over the systems then available. IPC's sales of the Feil trader turrets, according to the record, grew from \$320,000 for 20 units in 1974, its first year, to \$27,900,000 for 3500 units in 1983.

Thomas Feil, the inventor, was formerly an officer and part owner of IPC. In 1977 Mr. Feil formed the defendant company V Band Systems, Inc., and in 1980 Mr. Feil left IPC and joined V Band, of which he is president and chief executive officer. Defendants make and sell the trader turrets that are here accused of patent infringement.

On November 21, 1980, IPC filed suit in the Southern District of New York asserting infringement of U.S. Patent No. 3,991,282 (the '282 patent), invention of Thomas Feil. Defendants Feil and V Band raised the defense this patent was invalid in terms of 35 U.S.C. § 103. IPC's count for unfair competition was dismissed by the court and is not before us. Various counterclaims were separated and are apparently still pending.

In May of 1981 IPC filed in the U.S. Patent and Trademark Office (the PTO) an application to reissue the '282 patent. IPC cited to the examiner articles by M.E. Ozenberger and W.H. Keith, both of the Bell Telephone Laboratories, on which articles defendants were relying before the district court, and which had not previously been before the examiner. The district court refused to stay the action before it pending completion of the reissue examination, and therefore the reissue examination was suspended by the PTO in accordance with its rules. On defendants' motion for summary judgment, the district court on June 1, 1982 held all claims of the '282 patent invalid for obviousness under 35 U.S.C. § 103. *Interconnect Planning Corp. v. Feil*, 543 F.Supp. 610, 614-19, 215 USPQ 734, 736-41 (S.D.N.Y. 1982).

Following this decision, at IPC's request the PTO resumed examination of the reissue application. The court's decision was provided to and considered by the examiner. A supple-

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ecision, at IPC's request the mination of the reissue ap- t's decision was provided to the examiner. A suppl-

mental reissue declaration by IPC referred to this decision as a basis for the reissue applica- tion. The '282 patent was surrendered, and on February 8, 1983 the PTO granted the reissue patent, RE 31,144, IPC having restricted its claims in various ways and having overcome the newly cited prior art.

Defendants moved for summary judgment of invalidity of the reissue patent, asserting collateral estoppel based on the court's decision on the '282 patent, and also asserting invalidity under 35 U.S.C. § 103. IPC resisted the motion, and the parties' memoranda, affidavits, depositions, and other documents are of record. For reasons similar to those of the 1982 decision, the motion for summary judgment was granted on June 20, 1984.

That decision, holding all of the reissue claims invalid, was certified and made final under Fed. R. Civ. P. 54(b), with instructions by the court that IPC "attempt to have any appeal . . . heard at the same time and before the same panel" as any appeal from a decision on the same patent by the United States District Court for the District of New Jersey.¹ We agreed. Both appeals are decided this day.

Although both appeals involved similar issues and argument, specific to the New York suit are certain procedural issues, as discussed *infra*.

Collateral Estoppel

Defendants argue that IPC's appeal rights are curtailed on the basis of collateral estoppel. Two separate but related issues of estoppel are raised, both arising out of the district court's 1982 decision on the '282 patent.

A.

Defendants assert first that IPC can not now appeal from or argue those aspects of the 1984 decision on the reissue patent which are "common to" the 1982 decision on the '282 patent, on the ground that those aspects could have been appealed earlier, and that it is too late to do so now. IPC asserts in response that (1) the issues are not the same, (2) a different patent is involved, and (3) the 1982 decision was not final.

Considering the finality issue, for collateral estoppel to arise the prior decision need not have been final in the sense of 28 U.S.C. § 1291 but, in the words of the Restatement, the prior

adjudication must have been "sufficiently firm to be accorded conclusive effect". Restatement (Second) of Judgments § 13 (1982). Sufficient firmness, according to the Restatement, requires that the party against whom the estoppel is asserted have had the right, even if not exercised, to challenge on appeal the correctness of the earlier decision. Restatement (Second) of Judgment, § 13 reporter's note comment f (1982). Defendants argue that IPC had three such opportunities: appeal under 28 U.S.C. § 1292(a)(1), which governs appeals from interlocutory orders involving injunctions; appeal under 28 U.S.C. § 1292(c)(2), which governs appeals in patent infringement cases final except for an accounting; and appeal under Fed. R. Civ. P. 54(b), which governs judgment on fewer than all of multiple claims in an action.

None of these situations controls the case before us. 28 U.S.C. § 1292(a)(1) relates to orders involving injunctions, and although defendants argue that IPC's complaint necessarily invokes this section, this does not impart automatic appealability to interlocutory orders that do not involve injunctions. As for 28 U.S.C. § 1292(c)(2), the district court's judgment was not final except for an accounting, in light of the pendency of counterclaims. 9 J. Moore, B. Ward, & J. Lucas, *Moore's Federal Practice*, ¶ 110.19[4], at 220 (1985). Fed. R. Civ. Proc. 54(b) requires that the court have expressly directed entry of a final judgment, and that "[i]n the absence of such determination and direction, any [decision] which adjudicates fewer than all the claims . . . shall not terminate the action as to any of the claims". See also 6 Moore's Federal Practice ¶ 54.42, at 813.

Neither IPC nor the defendants asked the district court to enter a final judgment on its decision holding the '282 patent invalid, and the court did not do so. Defendants assert, however, that IPC should now be estopped because it did not move for finality of the ruling nor request that the judgment be certified for interlocutory appeal. An application for certification is by no means certain to be granted and, in this case, IPC's eventual request for certification of the original decision was opposed by defendants and was refused by the court.

The law of collateral estoppel is not intended to penalize a party for declining to try to take a piecemeal appeal. Further, the '282 patent had been placed in reissue, and an appeal on the merits of patent claims for which reissue was being sought would have been a meaningless exercise, as may have been recognized at the time.

[1] We conclude that the district court's 1982 decision on the '282 patent claims, a

¹ *IPC Communications, Ltd. v. Standard Tele- services Supply, Inc.*, No. 81-1832D (D.N.J. 1984) (unreported), vacated and remanded, No. 84-1599 (Fed. Cir. —, 1985) (unreported).

decision not final, not certified, not appealed, and mooted by subsequent events, lacks collateral estoppel effect for the purpose urged by defendants. The issue here on appeal is the validity of the claims of the reissue patent, an issue that did not exist at the time of the decision on validity of the '282 patent claims. There is no estoppel against appellate review of all aspects pertinent to the decision on the reissue claims. 1B Moore's Federal Practice ¶ 0.441 [3.-3], at 737.

B.

IPC asserts that the district court incorrectly invoked collateral estoppel when it analyzed the reissue claims by comparing them with the original claims of the '282 patent, then applying prior art only to the differences between the reissue claims and the original claims. Our predecessor court, the U.S. Court of Claims,² has confronted related situations, wherein estoppel was raised as to unadjudicated claims of a patent whose other claims had been adjudicated in an earlier action. The Court of Claims adopted a pragmatic approach, stating that the first step was to determine whether any new issues were raised as to the nonlitigated claims. In *Westwood Chemical, Inc. v. United States*, 525 F.2d 1367, 1375, 187 USPQ 656 (Ct.Cl. 1975), adopting 186 USPQ 383, 389 (Ct.Cl.Tr.Div. 1975), the court said:

Where obviousness is the basis for the prior invalidity holding, an inquiry into the identity of the validity issue is more properly phrased in terms of the factual inquiries mandated by *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 466-467, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966), as a prerequisite to such a validity determination.

Applying the *Graham* guidelines, the court said:

Thus, the inquiry should be whether the nonlitigated claims present new issues as to the art pertinent to the nonlitigated claims; as to the scope and content of that art; as to the differences between the prior art and the nonlitigated claims; and as to the level of ordinary skill in that art. If none of these inquiries raises any new triable issues, then the obviousness determination in the prior proceeding should be equally applicable to the nonlitigated claims.

² In *South Corp. v. United States*, 690 F.2d 1368, 215 USPQ 657 (Fed. Cir. 1982), the Federal Circuit adopted as precedent the decisions of the Court of Claims and the Court of Customs and Patent Appeals.

Id. See also *Bourns, Inc. v. United States*, 537 F.2d 486, 199 USPQ 256 (Ct. Cl. 1976), adopting 187 USPQ 174 (Ct. Cl. Tr. Div. 1975); *Carter-Wallace, Inc. v. United States*, 496 F.2d 535, 538, 182 USPQ 172, 175 (Ct. Cl. 1974) (in determining the applicability of the estoppel, the first consideration is "whether the issue of invalidity common to each action is substantially identical.").

The question of substantial identity of reissue claims arose in *Plastic Container Corp. v. Continental Plastics of Oklahoma, Inc.*, 607 F.2d 885, 203 USPQ 27 (10th Cir. 1979), cert. denied, 444 U.S. 1018, 204 USPQ 696 (1980), wherein the court determined that the reissue claims were not substantially identical to the original claims, and therefore that collateral estoppel did not apply.

In *Bourns*, responding to plaintiff's argument that according collateral estoppel effect to non-identical adjudicated claims would amount to treating the claims previously held to be invalid as prior art, the court agreed that this would be inappropriate:

A domino approach in which each successively narrower claim is compared with the one before it, not with the prior art, is inappropriate since it improperly gives prior-art effect to the subject matter of an invalid claim. In *re Craig and Street*, Cust. & Pat. App., 411 F.2d 1333, 1335, 162 USPQ 157, 158-159 (1969).

537 F.2d at 493, 187 USPQ at 179.

The district court compared the reissue claims with the '282 claims, and erroneously concluded that reissue claims 1 through 6 were substantially identical to the original claims, and that reissue claims 7 through 9, although not substantially identical, involved some substantially identical "issues".

This erroneous legal conclusion may have compounded the error in the next step, wherein the court compared the differences between the original and the reissue claims with prior art that was pertinent only to those differences, thus effectively giving the original claims prior art effect — the pitfall against which *Bourns* cautioned:

A claim may be invalid for obviousness under 35 U.S.C. § 103 but still describe a combination not found in the prior art. Moreover, it is well settled that each claim of a patent is entitled to a presumption of validity and is to be treated as a complete and independent invention. 35 U.S.C. § § 282, 288. *Leeds & Catlin v. Victor Talking Machine Co.*, 213 U.S. 301, 319, 29 S.Ct. 495, 53 L.Ed. 805 (1909); *Smith Industries International v. Hughes Tool Co.*, 396 F.2d 735, 736 (5th Cir. 1968).

Bourns, Inc. v. United States, 537 199 USPQ 256 (Ct. Cl. 1976), 37 USPQ 174 (Ct. Cl. Tr. Div. *er-Wallace, Inc. v. United States*, 35, 538, 182 USPQ 172, 175 (Ct. n determining the applicability of , the first consideration is "wheth- of invalidity common to each action ally identical.").

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[2] *Id.* When a patent has been reissued with claims that are not substantially identical to the original claims, the invention as a whole, as now claimed, must be evaluated in terms of 35 U.S.C. § 103. The original claims, whether valid or invalid, are not prior art against the reissued claims.

The Summary Judgment

The proceeding from which this appeal is taken was styled "summary", in that the court's decision was made on defendants' motion for summary judgment. The earlier decision on the '282 patent was also made on defendants' motion for summary judgment. IPC contends that the matter was inappropriate to summary judgment, in view of the presence of disputed issues of material fact.

Defendants Feil and V Band argued before the district court, and repeat before us, that no material fact is in dispute, that the questions before the district court and before us in this appeal are purely legal ones, and that the issue was properly dealt with summarily. In its discussion of reissue claims 7 through 9, which claims had no counterpart in the original patent, the district court referred to "claims and issues that have not yet been subjected to a full and fair adjudication", 587 F.Supp. at 1500, 223 USPQ at 965; the court viewed both proceedings as "full" as well as fair, a process not always accommodated by summary proceedings on a documentary record.

Obviousness *vel non* under 35 U.S.C. § 103 is a question of law, whose conclusion requires preliminary determination of several underlying factual issues, as set out in *Graham v. John Deere Co.*, 338 U.S. 1, 148 USPQ 459 (1966). See also *Gardner v. TEC Systems, Inc.* 725 F.2d 1338, 1344-45, 220 USPQ 777, 782-83 (Fed. Cir.) (in banc), cert. denied, 105 S.Ct. 116, 225 USPQ 232 (1984). These factual issues relate to the scope and content of the prior art, the differences between the prior art and the claimed invention as a whole, the level of ordinary skill in the art at the time the invention was made, and the so-called "secondary considerations" that reflect the contemporaneous response to the invention.

In reviewing IPC's assertions that there were genuine issues of material fact relating to the *Graham* inquiries, we have reviewed the submissions of the parties. Before the court, according to the record, were all the references cited as prior art; as well as the depositions of Examiner Randall P. Myers of the United States Patent and Trademark Office, engineer

John Fitzmaurice of New York Telephone, and inventor/defendant Thomas E. Feil; and various documentary exhibits. Also of record were the affidavits of Alan R. Fitzpatrick, president of American Telecommunications Concepts; IPC's technical experts Dennis Maywald and Herbert Goldwag; Thomas P. Bradbury, vice president and treasurer of IPC; and extensive written submissions and arguments.

Although fact and opinion are intertwined in many of these documents, the factual considerations required by the *Graham* analysis appear to have been adequately presented in the record. The technological structure and operation of the devices of the prior art were not in material dispute,³ although there was strong dispute about the relationship of the teachings of the references to the problems solved by the Feil system, and the weight to be given to evidence of the Feil invention's commercial success.

The district court stated that expert testimony was unnecessary, *Interconnect Planning Corp. v. Feil*, 587 F.Supp. at 1497, 223 USPQ at 963, and held all of the reissue claims invalid. As will be discussed, we think that the district court reached this conclusion by incorrectly applying the law of 35 U.S.C. § 103.

35 U.S.C. § 103

Those charged with determining compliance with 35 U.S.C. § 103 are required to place themselves in the minds of those of ordinary skill in the relevant art at the time the invention was made, to determine whether that which is now plainly at hand would have been obvious at such earlier time.

The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time.

The invention must be evaluated not through the eyes of the inventor, who may have been of exceptional skill, but as by one of "ordinary skill." See *Stewart-Warner Corp. v. City of Pontiac, Michigan*, 767 F.2d 1563,

³ IPC argues that the district court should not have resolved any question of substantial identity between the claims of the original and reissue patents in defendants' favor because that is a contested fact question which should not have been resolved against the nonmovant, citing *Tee-Pak, Inc. v. St. Regis Paper Co.*, 491 F.2d 1193, 1200, 181 USPQ 75, 80 (6th Cir. 1974). Under this court's precedent substantial identity between claims, a matter of claim interpretation, is a question of law. See, e.g., *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 956, 220 USPQ 592, 596 (Fed. Cir. 1983), cert. denied, 105 S.Ct. 127, 225 USPQ 232 (1984).

1570, 226 USPQ 676, 680-81 (Fed. Cir. 1985).

This is not a facile statutory interpretation. The quality of non-obviousness is not easy to measure, particularly when challenged years after the invention was made. That which may be made clear and thus "obvious" to a court, with the invention fully diagrammed and aided, in this case, by a hostile inventor seeking to eliminate his own invention, may have been a breakthrough of substantial dimension when first unveiled.

The judicial application of uniform standards for determining compliance with 35 U.S.C. § 103 is essential, because the technological incentives fostered by the patent system depend on consistent interpretation of the law. To this end, faithful adherence to the patent statute and guiding precedent fosters uniformity in result.

A.

Following examination by the Patent and Trademark Office, a duly issued patent is presumed valid, as is a duly reissued patent. The burden of proving otherwise resides with the person challenging its validity. 35 U.S.C. §282.

This statutory presumption derives in part from recognition of the technological expertise of the patent examiners. A reissue application receives a fresh examination, normally concentrated on those references and reasons that occasioned its filing. The record shows that this reissue application received a supplemental internal review by three examiners because it was involved in litigation.

Although IPC's view is incorrect that the PTO's decision must be given controlling weight, we do agree that the examination procedure and result should be given appropriate consideration and due weight by the court. As stated in *Fromson v. Advance Offset Plate, Inc.*, 755 F.2d 1549, 1555, 225 USPQ 26, 31 (Fed. Cir. 1985), "[t]he Examiner's decision, on an original or reissue application, is never binding on the court. It is, however, evidence the court must consider in determining whether the party asserting invalidity has met its statutory burden by clear and convincing evidence".

Upon reissue the "burden of proving invalidity was made heavier", as stated in *Fromson, supra*. This burden must be met by the party asserting invalidity. The district court here relied on the identical references that had been before the reissue examiners, and disdaining the need for expert testimony, reached a different conclusion in law. Although we affirm the obligation of the district court to

reach an independent conclusion, the reissue patent reaches the court clothed in a statutory presumption of validity, and clear and convincing evidence is required to surmount this presumption. *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359-60, 220 USPQ 763, 770 (Fed. Cir.), cert. denied, 105 S.Ct. 95, 224 USPQ 520 (1984).

B.

The court referred to the content of the prior art references in broad terms, occasionally using the title of a reference to explain its pertinence. In this crowded art of telephone systems, as IPC correctly pointed out, it is not enough to show that each of the components used by Feil was known, and had been used in other telephone systems. Feil did not claim to have invented any of the components of his claimed system.

[3] From its discussion of the prior art it appears to us that the court, guided by the defendants, treated each reference as teaching one or more of the specific components for use in the Feil system, although the Feil system did not then exist. Thus the court reconstructed the Feil system, using the blueprint of the Feil claims. As is well established, this is legal error. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 774, 218 USPQ 781, 791 (Fed. Cir. 1983), cert. denied, 104 S.Ct. 1284, 224 USPQ 520 (1984).

Illustrative is the court's analysis of reissue claim 1. Pertinent is not only its analysis of the differences between the reissue claim and the prior art, but also the differences between the reissue claim and the original claim. In claim 1, matter enclosed in brackets appeared in the original claim but forms no part of the reissue claim, and matter printed in italics was added by reissue:

1. For a telephone system in which telephone communication is capable of being established for each telephone station of a plurality of telephone stations over a standard telephone line by directly connecting each telephone station to a selected standard telephone line of a plurality of standard telephone lines, each of said plurality of standard telephone lines capable of being directly connected to each of said plurality of telephone stations, an improvement comprising:
 - a plurality of pairs of contacts, with respective pairs of said contacts being connected with respective ones of said standard telephone lines for allowing said communication;
 - a plurality of relay coils, with respective ones of said relay coils controlling respective pairs of said contacts to be opened or closed;

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independent conclusion, the reissue teaches the court clothed in a statutory notion of validity, and clear and convincing evidence is required to surmount this notion. *American Hoist & Derrick Co. & Sons, Inc.*, 725 F.2d 1350, 1359-60, 763, 770 (Fed. Cir.), cert. denied, 119 S.Ct. 1195, 224 USPQ 520 (1984).

B.

The court referred to the content of the prior art in broad terms, occasionally in the title of a reference to explain its use. In this crowded art of telephone systems, as IPC correctly pointed out, it is not to show that each of the components Feil was known, and had been used in telephone systems. Feil did not claim to have invented any of the components of his system.

From its discussion of the prior art it is to us that the court, guided by the teachings, treated each reference as teaching more of the specific components for use in the Feil system, although the Feil system did not exist. Thus the court reconstructed the system, using the blueprint of the Feil system. As is well established, this is legal error. *Salman v. Kimberly-Clark Corp.*, 713 F.2d 774, 218 USPQ 781, 791 (Fed. Cir. 1983), cert. denied, 104 S.Ct. 1284, 224 USPQ 520 (1984).

Relevant is the court's analysis of reissue claim 1. Pertinent is not only its analysis of the differences between the reissue claim and the parent claim, but also the differences between the claim and the original claim. In claim 1, as enclosed in brackets appeared in the parent claim but forms no part of the reissue claim, and matter printed in italics was added by reissue:

For a telephone system in which telecommunication is capable of being established for each telephone station of a plurality of telephone stations over a standard telephone line by directly connecting each telephone station to a selected standard telephone line of a plurality of standard telephone lines, each of said plurality of standard telephone lines capable of being directly connected to each of said plurality of telephone stations, an improvement comprising:

a plurality of pairs of contacts, with respective sets of said contacts being connected with respective ones of said standard telephone lines for allowing said communication;
a plurality of relay coils, with respective ones of said relay coils controlling respective sets of said contacts to be opened or closed;

a plurality of sets of non-locking pushbutton [switch means] switches with each set of pushbutton [switch means] switches connected to respective ones of said telephone stations with respective ones of said pushbutton [switch means] switches of said sets of pushbutton [switch means] switches corresponding to respective ones of said standard telephone lines and being connected with respective ones of said relay coils and being depressed for energizing a selected one of said relay coils for closing a corresponding pair of contacts to allow said telephone communication; [and]

an electronic holding circuit for each of said relay coils, said holding circuits being operative

to establish a held state after initial energization of the associated relay coil by momentarily depressing the associated pushbutton switch, and

to maintain said corresponding pair of contacts closed while in the held state;

a logic circuit for each station connected to said holding circuits to detect conditions for releasing the held state;

each of said stations comprising [first light display means] a set of status lights, connection means connecting corresponding pushbuttons of said sets of pushbutton [switch means] switches in each of said stations and to said [first light display means] status lights for energizing said [first light display means] status lights in each station to display the status of each of said plurality of standard telephone lines in each of said stations.

said station further comprising [first light display means] an active line indicator separate from said status lights connected to said pushbutton [switch means] switches for identifying the standard telephone line of said plurality of standard telephone lines that the telephone station is using for said telephone communication.

Reissue claim 1 was held invalid on two grounds. The first ground was that it was substantially identical to claim 1 of the '282 patent, and thus invalid on the basis of collateral estoppel. The court in its 1982 decision referred to Carter U.S. Patent No. 3,150,238 and Foulkes U.S. Patent No. 3,757,056 as disclosing "non-locking buttons, relay coils and pairs of contacts" as applied to the original claim 1. In the 1984 decision the court stated that "Claim 1 has not been changed in such a way that alters the above finding of disclosure by prior art." 587 F.Supp. at 1499, 223 USPQ at 964. This treatment of the reissue claim is not supported by the claim content, as will be apparent from the court's further discussion of claim 1.

As the second ground for its holding of invalidity the court analyzed the changes made by reissue. The court identified three areas as new to reissue claim 1, and applied five references to these areas as follows: "See Defendants' Exhs. C13, D4-D6 (non-locking buttons); Defendants' Exhs. C4, C7 (holding circuits); Defendants' Exhs. C16, C13 (separate active lines)." *Id.* at 1499, 223 USPQ at 964 (footnotes omitted).

The first set of cited exhibits refers to articles by Keith, "A New Switching System for 'Right of Way' Companies," *Bell Laboratories Record*, Apr. 1968, and Ozenberger, "Voice Communication System for Air Traffic Control," *Bell Laboratories Record*, May 1961, which the court stated taught the use of non-locking pushbuttons. The second set refers to the Carter patent, which the district court said teaches a "Relay Control Circuit" (the title of the Carter patent), and the Foulkes patent which "recites that '[e]ach of these [control] circuits may take any desired and presently known form . . . to perform a recognized control function . . . evaluat[ing] the 'hold' feature'". *Id.* at 1499 n.6, 223 USPQ at 946 n.6. The third set of exhibits refers to Simon U.S. Patent No. 3,928,732, which the district court described by its title, "Extension and Line Indicating Display System for Key Telephone System," and Keith, which the district court stated "also discloses separate active lines." *Id.* at 1499 n.7, 223 USPQ at 964 n.7.

The court's analysis of the scope of the new material in reissue claim 1 in itself shows the error in the court's conclusion that as a matter of law reissue claim 1 is substantially identical to its parent claim. The claim limitations of the electronic holding circuits for each relay coil, the logic circuit, and separate active line indicator, in combination with the non-locking pushbutton switches connected to the relay coils, were added by reissue. Observing these differences, their relationship to the invention as a whole, and the prior art, we conclude as a matter of law that reissue claim 1 is not substantially identical to the original claim. The 1982 decision, which was directed to the original claims, does not apply to the reissue claims. Collateral estoppel as a basis for the court's holding of invalidity is not supported in law.

Having determined that a reissue claim is not substantially identical to the parent, the parent claim is of no further moment. As stated in *Wayne-Gossard Corp. v. Moretz Hosiery Mills, Inc.*, 539 F.2d 986, 991, 191 USPQ 543, 546-47 (4th Cir. 1976), "the original claim was at an end, denuded of all potency save as a bench mark of interpretation, at the time of the reissue's infringement."

The original claim is not prior art against the reissue claim. It is not correct to weigh the reissue claim against the original claim. It is not correct to weigh the changes in the reissue claim against the original claim. It is the reissue claim alone that is to be analyzed in accordance with the *Graham* guidelines, and the differences to be considered are the differences between the reissue claim as a whole and the prior art.

In the court's 1982 analysis of the original claims, to which the court referred in its 1984 decision, the court had identified "six principal features which plaintiff argues are not obvious" and explained why the court concluded that these features are obvious by referring to various prior art references showing various of the features in various contexts. *Interconnect Planning Corp. v. Feil*, 543 F.Supp. at 617, 215 USPQ at 739. As we have observed, it is the emphasis on the obviousness of "features," rather than the claimed telephone system as a whole, that constitutes the flaw in the application of section 103 to the Feil claims. As stated in *In re Shuman*, 361 F.2d 1008, 1012, 150 USPQ 54, 57 (CCPA 1966):

It is impermissible to first ascertain factually what appellants *did* and then view the prior art in such a manner as to select from the random facts of that art only those which may be modified and then utilized to reconstruct appellants' invention from such prior art.

The court in 1982 summarized its conclusion with respect to these six "features" by observing (1) that although the pairs of contacts and relay coils "is not disclosed in either the Keith Article or the Ozenberger Article", the Foulkes and Carter patents do disclose them; (2) that Keith, Ozenberger, and Foulkes refer to pushbutton switches; (3) that Keith shows a set of display lamps although Ozenberger uses a single lamp, and that Paraskevavos (U.S. Patent No. 3,727,003) and Simon et al. show either a digital display or the incoming line number; (4) that Paraskevavos shows a decoder and that "the diode matrix was no mystery to one engineer" (Thomas Fitzmaurice, of Bell Labs, who testified that he readily understood the Feil system after he was shown it); (5) that Keith shows which lines are active; and (6) that the asserted unique master station hook up with blocking means is shown in Ozenberger and a Verdon patent (U.S. Patent No. 3,819,871). *Interconnect Planning Corp. v. Feil*, 543 F.Supp. at 617-19, 215 USPQ at 739-40.

In its 1984 decision the court added the additional citations of references pertinent to the changes in the reissue claims, as discussed above. As in its citation of references against the various features of the original claims, the

court selected from each reference a feature or features that also appeared in the reissue claims. No reference, however, suggested the overall arrangement, the "architecture", of the Feil system.

IPC presented affidavit testimony explaining the references in the context of the state of the telephone systems art at the time, none of which testimony was controverted other than by attorney argument. The most advanced multi-line devices at the time the invention was made, according to this record, used the then state-of-the-art crossbar switching equipment, and electrical or mechanical interconnections or interlocks. The two Bell Labs publications of Keith and Ozenberger, on which defendants and the district court placed substantial emphasis, used crossbar switching. Feil did not.

Mr. Feil's affidavit filed with the district court states "The Ozenberger and Keith articles disclose what I thought I invented in 1974". Mr. Feil made no reference to the crossbar switches required by these references, and offered no discussion of either differences or similarities between his system and those of these references.

The Carter patent used relay switches in the telephone switching system it describes. Carter, of Bell Laboratories, taught the use of quick-release control relays in combination with slow-release work relays, to achieve the specific purposes desired by Carter. Carter also required use of a "locking chain" rather than independently operating relays, and a more complex communication path as compared with Feil's direct connections. Feil established multiple direct connections in a system where theretofore it was believed, according to the record, that crossbar switches would be required.

The Feil system eliminated both crossbar switches and mechanical interlocks or mechanically locking pushbuttons, and instead used relays, a well-known type of switch. But Feil avoided the need (of Carter) to establish potentially large numbers of contacts and operates a concomitantly large number of relays in series in order to connect stations within the system. As IPC's uncontroverted testimony shows, Feil avoided interconnections and interlocks, both of which, according to the Maywald affidavit, had previously been considered necessary to lock out faults. The Maywald affidavit stated that Carter's approach would be "impossible and impractical" in the trader turret application because "[t]o try and accurately control the release times of different relays over a long period of time would be virtually impossible considering the wear and deterioration of components" in a "trader turret network involving some 20,000 or more relays". Maywald's explanation of the

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Feil used relay switches in the switching system it describes. Bell Laboratories, taught the use of control relays in combination with work relays, to achieve the results desired by Carter. Carter's use of a "locking chain" rather than merely operating relays, and a communication path as compared to direct connections. Feil's direct connections in a system, therefore it was believed, record, that crossbar switches

eliminated both crossbar mechanical interlocks or relay pushbuttons, and instead a well-known type of switch. But need (of Carter) to establish numbers of contacts and operantly large number of relays to connect stations within the system's uncontroverted testimony led interconnections and in which, according to the evidence, had previously been known to lock out faults. The evidence stated that Carter's application was "impossible and impractical" for application because "[t]o control the release times of over a long period of time is impossible considering the relation of components" in a work involving some 20,000 Maywald's explanation of the

technical operation of the references is uncontradicted, although defendants take issue in attorney argument with Maywald's conclusions.

The Foulkes patent, on which the district court also relies, described a "bipolar multiplexing circuit" based on a "contact tree" relay switching arrangement. Foulkes taught a telephone system that Maywald avers, without contradiction, "could not be realistically expanded into large systems like trader turrets". The district court did not explain how the Foulkes or other systems of different circuitry made obvious the different system of Feil's claims.

The Keith and Ozenberger systems, as previously discussed, are different systems from that of Feil. Like the systems of the other references, they contain some elements in common with that of Feil. The Ozenberger system, based on crossbar switches, was designed for air traffic control. The Keith system is described as tailored to the specific needs of "right-of-way" companies, and is a cordless system limited to up to eight consoles of up to a hundred lines. As Keith says, "[a] system of crossbar switches is the heart of the switching system". Neither Keith nor Ozenberger suggests that the crossbars be replaced with relays and that the other changes be made to produce the admittedly different Feil system.

The novelty of the Feil system is not controverted by the defendants. Its value in trader turret systems has received the ultimate recognition, market success and imitation.

35 U.S.C. § 103 requires that obviousness be determined with respect to the invention as a whole. See, e.g., *Jones v. Hardy*, 727 F.2d 1524, 1528, 220 USPQ 1021, 1024 (Fed. Cir. 1984); *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), cert. denied, 105 S.Ct. 172 (1984); *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537, 218 USPQ 871, 877 (Fed. Cir. 1983). This is essential for combination inventions, for generally all combinations are of known elements. *Environmental Designs, Ltd. v. Union Oil Co. of California*, 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed. Cir. 1983), cert. denied, 104 S.Ct. 709, 224 USPQ 520 (1984).

When prior art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577 & n.14, 221 USPQ 929, 933 & n.14 (Fed. Cir. 1984). There must be "something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination". *Lindemann*

Maschinenfabrik GmbH v. American Hoist and Derrick Co., 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984).

Critical to the analysis is an understanding of the particular results achieved by the new combination. The claims here at issue are directed to a combination of known components of telephone systems in an admittedly new way to achieve a new total system. Neither the district court in its opinion, nor the defendants, identified any suggestion in the prior art that the components be combined as they were by Feil or that such combination could achieve the advantages of the Feil system.

Not only must the claimed invention as a whole be evaluated, but so also must the references as a whole, so that their teachings are applied in the context of their significance to a technician at the time — a technician without our knowledge of the solution. The defendants propounded and the district court appears to have followed an analytical method that well illustrates the "mosaic" analogy discussed in *W.L. Gore & Assocs.*, 721 F.2d at 1552, 220 USPQ at 482, where this court said:

[T]he claims were used as a frame, and individual naked parts of separate prior art references were employed as a mosaic to recreate a facsimile of the claimed invention.

Defendants refer to the decision of the Supreme Court in *Sakraid v. Ag Pro, Inc.*, 425 U.S. 273, 189 USPQ 449 (1976). As the Court there held, Sakraid's combination of old elements to wash barn floors with flowing water did not produce a new or different function, and affirmed the district court's holding that "all of the elements of [the combination] are old . . . and the combination of them . . . being neither new nor meeting the test of non-obviousness." *Id.* at 274, 189 USPQ at 450. In the Feil invention the combination was admittedly new, and it produced a new system having theretofore unavailable attributes.

Recognizing the difficulty of casting one's mind back to the state of technology at the time the invention was made, courts have long recognized the usefulness of evidence of the contemporaneous attitude toward the asserted invention. A retrospective view of the invention is best gleaned from those who were there at the time. Mr. Feil, the inventory impugning his own invention, now avers that he did no more than did the prior art, specifically the Keith and Ozenberger articles. Mr. Feil's disavowal of his invention is staunch, although he less modestly commented in 1977, before he left IPC, on the reaction of Bell Labs' engineer at that earlier time:

He [Fitzmaurice] showed too much enthusiasm. I mean, he was really excited by the

thing. Like this is incredible. You guys are geniuses.

You're 50 miles ahead of Bell Labs. (App. Vol. VI, F357).

You know what he said. He said You're 50 miles ahead of Bell Lab? He said "miles", not years, he made it in miles. You're 50 miles ahead of the Bell Labs. (App. Vol. VI, F355).

Mr. Elia of the Republic Bank, one of IPC's customers, attested:

Upon viewing the equipment, the AT&T people indicated that it was unbelievable. They did not think it could be done. They were surprised that it was done. (App. Vol. VI, F360).

Although the district court remarked in its 1982 decision that evidence of commercial success "cannot be afforded any weight" "in light of my finding of obviousness", 543 F.2d at 619, 215 USPQ at 741, such evidence when present must be considered and afforded appropriate weight. *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 F.2d 1573, 1575, 222 USPQ 744, 746 (Fed. Cir. 1984), cert. denied, 105 S.Ct. 2138 (1985); *Jones v. Hardy*, 727 F.2d at 1530, 220 USPQ at 1026; *Medtronic, Inc. v. Cardiac Pacemakers, Inc.*, 721 F.2d 1563, 1575, 220 USPQ 97, 105 (Fed. Cir. 1983); *Stratoflex, Inc.*, 713 F.2d at 1538-39, 218 USPQ at 879; *In re Sernaker*, 702 F.2d 989, 996, 217 USPQ 1, 7 (Fed. Cir. 1983); *In re Mageli*, 470 F.2d 1380, 1383, 176 USPQ 305, 307 (CCPA 1973). IPC offered affidavit and deposition evidence, by two experts in telephone systems and by a Bell system engineer knowledgeable in the field of trader turrets. Their uncontroverted testimony was to the effect that the Feil system was perceived at the time as an exceptional technological achievement.

The requirement that "secondary considerations" be considered in determinations under section 103 aids in evaluating the state of the art at the time the invention was made. *In re Piasecki*, 745 F.2d 1468, 1475, 223 USPQ 785, 790 (Fed. Cir. 1984). It is not pertinent that the invention was easily understood after it was made — a factor that appears to have been considered significant by the district court, see 543 F.Supp. at 619, 215 USPQ at 741 — but whether it would have been obvious to make the invention at the time. Giving due weight to the market success and contemporaneous reaction to the Feil trader turret system, the record does not contain clear and convincing evidence that the Feil invention of the reissue claims would have been obvious to one

of ordinary skill in this art at the time the invention was made.

Reissue claims 2-9 are either dependent on reissue claim 1, include similar limitations, or include additional limitations. Although each claim has been considered separately, they need not here be treated in redundant detail. For each claim we are compelled to the conclusion that the burden of proving invalidity by clear and convincing evidence has not been met.

The summary judgment of invalidity of Reissue Patent No. 31,144, in terms of 35 U.S.C. § 103, is vacated, as is the dismissal of the infringement claim. The case is remanded to the district court for further proceedings consistent herewith.

VACATED and REMANDED.

District Court, S.D. New York

The Authors League of America, Inc., et al. v. Davis L. Ladd, Register of Copyrights, et al.

No. 82 Civ. 5731

Decided October 8, 1985

COPYRIGHTS

1. In general (§24.01)

Copyright Act's manufacturing clause, which prohibits importation or public distribution within U.S. of certain copyrighted publications which are written by American authors or domiciliaries and which are manufactured abroad, does not violate First Amendment.

Action by The Authors League of America, Inc., and Irwin Karp, The Association of America Publishers, Plaintiff-Intervenor, against David L. Ladd, Register of Copyrights, James Baker, Secretary of the Treasury, and William Von Raab, Commissioner, United States Customs Service, to challenge the constitutionality of Copyright Act "manufacturing clause," 17 USC 601-603. On defendants' motion to dismiss and on parties' cross-

motions for summary judgment for summary judgment.

Irwin Karp, Plaintiff-Intervenor, for plaintiff.

Paskus, Gordon (David S. Paskus) for defendant.

Rudolph W. G. Southern District of New York, U.S. Attorney.

James K. Man Mitchell & F and Stephen son, Richard Owen, Fellerton, D.C., for turers' Institute of America, Inc. tions Interna

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In this action, the constitutionality clause of the U.S.C. § 601 bids the import the United States tions of America are manufacturer.

The defendant action or, alteration. The plaintiff have cross-moved the reasons set the defendants' and denies the intervenor's cross. I. BACKGROUND

A. Statutory. The manufacturing Act is contained (c) of Title 17 Sections 601 and on October 19, Revision Act, 2588-90 (1976)

Prior to July 1982, by substituted by public distribution copies of a work.

¹ Section 601 of the Copyright Act of 1976, as amended, 17 USC 601, was amended by the Copyright Act of 1992, Pub. Law No. 102-170, § 101, October 28, 1992. On July 13, 1992, the Copyright Act of 1992 was amended by the Copyright Act of 1994, Pub. Law No. 103-190, § 101, October 28, 1994.

h circumstances, copyright ownership is l in the author.² Second, even if the ion did apply, because plaintiff would independent contractor, there would o be some writing evidencing the trans- his copyright to his subjects. See 17 . §101. Plaintiff has stated in a sworn it that there is no such writing or r. In the absence of defendants' putting ctual facts into issue, therefore, the ng of plaintiff's summary judgment mo- as appropriate and is upheld. rdered.

nts principally argue that the common law herein. As I have discussed above, however, i Act's provisions are exclusive in this area. ndants cannot dispute that the photogra- he "author" of the photograph. Moreover, :ulation that there could be some kind of authorship has no evidentiary support. y judgment in such a context is appropri- Exxon Corp. v. Federal Trade Commis- i F.2d 120, 128 (D.C. Cir. 1980) ("It is not t of Rule 56 to preserve purely speculative fact for trial * * *").

Court of Appeals, Federal Circuit

ACS-Hospital Systems, Inc.
v. Montefiore Hospital et al.

Nos. 83-1121 and 83-1132

Decided Apr. 27, 1984

PATENTS

1. Pleading and practice in courts — Bur-
den of proof — Validity (§53.138)

Presumption from patent grant — In
general (§55.1)

Presumption of validity is never annihilat-
ed, destroyed, or even weakened, regardless of
what facts are of record; rather it is clear
statutory procedural device that assigns to
party asserting invalidity burden of proving
invalidity; burden of persuasion is, and re-
mains always, on party asserting invalidity.

2. Construction of specification and claims
— In general (§22.01)

Construction of specification and claims
— By specification and drawings —
To save claim (§22.257)

Claims are to be read and construed in
light of specification and prosecution history
of patent; further, claim should be so con-
strued, if possible, as to sustain their validity.

3. Construction of specification and claims
— In general (§22.01)

Claim construction is question of law.

4. Patentability — Anticipation — Com-
bining references (§51.205)

Obviousness cannot be established by com-
bining teachings of prior art to produce
claimed invention, absent some teaching or
suggestion supporting combination; teachings
of references can be combined only if there is
some suggestion or incentive to do so, under
35 USC 103.

5. Infringement — Tests of — Comparison
with claims (§39.803)

Infringement is determined on basis of
claims, not on basis of comparison with pat-
entee's commercial embodiment of claimed
invention.

6. Court of Appeals for the Federal Cir-
cuit — Weight given decision re-
viewed (§26.59)

CAFC is confined to trial court's limited
findings and is forced to draw from facts

found, those inferences that are necessary to
support ultimate finding that patent is not
infringed; in this endeavor CAFC does not
itself find those facts that trial court failed to
set out for it; as appellate court, CAFC lacks
power to perform that exercise; where trial
court fails to make findings, judgment will
normally be vacated and action remanded for
appropriate findings to be made; where full
understanding may be had without aid of
separate findings, however, narrow exception
to that general rule is recognized; ultimate
finding of fact in case, whether initially by
trial court, or as affirmed on appeal, rests on
same underpinnings, that is, necessary sub-
sidiary facts, supported by evidence of record,
that lead to ultimate finding; where district
court has not misapplied controlling legal
standards in its evaluation of evidence, its
ultimate finding as well as subsidiary findings
upon which ultimate finding necessarily de-
pends, is subject to review on appeal under
clearly erroneous standard of FedRCivP
52(a); record is examined in order to review
trial court's judgment, and findings it made or
necessarily had to have made to support that
judgment and, thus, to conclude controversy
at appellate stage without unnecessary fur-
ther expenditure of judicial resources, if
possible.

7. Costs — Attorney's fees (§25.5)

Court of Appeals for the Federal Circuit
— Weight given decision reviewed
(§26.59)

Prevailing accused infringer must establish
that trial judge abused his discretion in regard
to accused infringer's motion for attorney
fees, not merely that trial judge committed
clear error, in order to prevail on cross appeal
on that issue.

Particular patents — Television
Switches

4,183,057, Sonnenberg, Actuating System
for a Rental Television, holding of invalidity
reversed; holding of noninfringement
affirmed.

Appeal from District Court for the West-
ern District of Pennsylvania, Dumbauld, J.;
220 USPQ 731.

Action by ACS Hospital Systems, Inc.,
against Montefiore Hospital, and Wells Na-
tional Services Corporation, for patent in-
fringement. From judgment for defendants,
but denying attorney fees, both parties ap-
peal. Modified.

Frank J. Benasutti, Philadelphia, Pa., for appellant.

David J. Cushing, Washington, D.C. (Darryl Mexic, Washington, D.C., on the brief) for appellees.

Before Miller and Smith, Circuit Judges, and Re, Judge.*

Smith, Circuit Judge.

In this patent case, ACS Hospital Systems, Inc. (ACS), appeals from a judgment of the U.S. District Court for the Western District of Pennsylvania holding U.S. patent No. 4,183,057, issued to Sonnenberg (the Sonnenberg patent), invalid as obvious under 35 U.S.C. §103 (1976) and not infringed. Montefiore Hospital and Wells National Service Corp. (Wells) cross-appeal from the district court's denial of their motion for attorney fees. The judgment is reversed with respect to invalidity and affirmed with respect to noninfringement. With respect to Wells' cross-appeal from the denial of attorney fees, the judgment is affirmed.

Background

ACS's Sonnenberg patent claims a rental television system comprising a key operated actuating switch, an override switch, and a signal light to indicate that the override switch has been actuated. When the key switch is in the "on" position, the television operates normally. For rental use, the key switch is placed in the "off" position by a key operator. In order to rent the television, the viewer depresses the override switch which enables the television to operate normally without the necessity of turning on the key operated switch. When the override switch has been activated the indicator signal is illuminated, signaling that the television has been rented. Claim 1 is representative:

A television system constructed for rental use, the television system comprising:

actuating means including a key operated switch switchable between an off position for preventing normal operation of the television and an on position for enabling the television to be operated; override switching means capable of being switched from a normal

position to an actuated position for overriding said key operated switch when in its off position and enabling the television to be operated; and said override switching means when switched in to [sic] its actuated position remains in said position until said key operated switch is switched into its on position; and indicating means for providing an indicating signal when said override switching means has been switched into its actuated position.

Validity

The trial court held the claims of the Sonnenberg patent invalid under section 103. While the trial court's opinion deals predominantly with infringement, the court purported to apply the standards articulated in *Graham v. John Deere Co.*¹ in determining the issue of validity. In concluding that the Sonnenberg patent is invalid under section 103, the district court relied on override switches generally and ACS's "COMPU-TEL" fully automated television rental system as prior art.

The court below stated that "the overriding of switches by providing an alternative path for current to actuate an appliance is a commonly practiced technique well known in the art prior to Sonnenberg's patent." It held that his claim 1 is therefore invalid as obvious. The trial judge adopted Wells' expert's description of ACS's COMPU-TEL system and held the Sonnenberg patent invalid as an attempt by ACS to "monopolize all systems of enabling a hospital patient to view television * * * without the aid of an attendant." (Emphasis in original.) He commented that "[t]he statutory presumption [of validity] of 35 U.S.C. 282 is entirely annihilated by the indisputable facts in the record."

Presumption of Validity

[1] As an initial matter, we hold that the trial court's treatment of the presumption of validity is incorrect as a matter of law. The presumption is *never* annihilated, destroyed, or even weakened, regardless of what facts are of record.² Rather, it is a clear statutory procedural device which assigns to the party

¹ *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966).

² *Siratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1534, 218 USPQ 871, 875-76 (Fed.Cir. 1983).

* The Honorable Edward D. Re, Chief Judge, United States Court of International Trade, sitting by designation.

¹ Norris, U.S. patent No. 2,856,474; Townsend, U.S. patent No. 3,188,384; Sargent, U.S. patent No. 3,335,421; Daniel, U.S. patent No. 3,631,444; and Kosco, U.S. patent No. 3,886,302.

the Wells and the ACS systems. In so doing, it adopted Wells' expert's explanation of the differences between claim 1 and the Wells system — differences relating to literal infringement, not validity. We conclude that the trial court erred in adopting Wells' expert's interpretation of claim 1.

Differences between the prior art and the claimed invention are apparent from the record. First, while override switches are used in a wide variety of applications, the examples of override switches cited by the district court are not relevant to the claimed subject matter as a whole — television rental systems. The district court made no attempt in its opinion to identify the differences between the override switching examples that it cited and the claimed subject matter.

Second, the record discloses that COMPU-TEL is a fully automated television rental system whereas the claimed invention involves human monitoring and control. While COMPU-TEL and the claimed invention both exhibit certain switching elements, the functions of the switching elements in the two systems are different. The fully automated operation of the COMPU-TEL system does not involve overriding a locked key switch. The patient switch in the COMPU-TEL system functions to actuate the television as well as to initiate billing. The override switching means claimed in the Sonnenberg patent, on the other hand, functions to provide an alternative current path to the locked key switch and to actuate the indicator light.

Third, the prior art of record that the court did not discuss also differs significantly from the claimed subject matter. The five patent references cited in the Sonnenberg patent involve a variety of lock, metering, and control systems. None of them, however, employs an override switching mechanism to overcome a key operated actuating switch. The Western New York Hospital system involves a three position key switch. Yet, that system differs from the claimed subject matter in that it too does not employ override switching means.

Hence, we hold the trial court's assessment, that there are no differences between the claimed subject matter and the prior art, was clearly erroneous.

Level of Ordinary Skill and Secondary Considerations.

Additionally, the court below made no express finding with respect to the level of ordinary skill in the art. The trial court's analysis, however, clearly indicates that the level of skill was considered to be quite low. We interpret the court's findings as fixing the

level of ordinary skill in the art as that of a layman. That finding has not been shown to be clearly erroneous. The court made no findings with respect to secondary considerations.

Claim Construction.

As noted above, the trial court's opinion reflects an extremely broad construction of the claims. Contrary to the district court's construction of the claims, the Sonnenberg patent does not claim "all systems of enabling a hospital patient to view television normally under his own power without the aid of an attendant." (Emphasis in original.) The court ignored express claim limitations governing the function of the switching means.

[2,3] Claims are to be read and construed in light of the specification and the prosecution history of the patent.¹⁰ Further, claims should be so construed, if possible, as to sustain their validity.¹¹ Applying these principles, the claims of the Sonnenberg patent should be given a far more limited construction than that given by the district court in holding the claims invalid. The claims are limited to a system in which override switching means function to override a key switch when in its "off" position, enabling the television to operate normally. The Sonnenberg patent does not claim "all" hospital rental systems capable of operation without an attendant. Claim construction is a question of law.¹² We hold that the trial court's construction of the claims is incorrect as a matter of law.

Obviousness.

Turning now to the determination of obviousness under section 103, we conclude that none of the references, either alone or in combination, would have disclosed or suggest-

¹⁰ *Fromson v. Advance Offset Plate, Inc.*, 720 F.2d 1565, 1570-71, 219 USPQ 1137, 1140-41 (Fed. Cir. 1983); *Autogiro Co. v. United States*, 384 F.2d 391, 397-99, 155 USPQ 697, 702-04 (Ct. Cl. 1967).

¹¹ *Carman Indus., Inc. v. Wahl*, 724 F.2d 932, 937 n.5, 220 USPQ 481, 485 n.5 (Fed. Cir. 1983); *Klein v. Russell*, 86 U.S. 433, 466 (1874); *Turrill v. Michigan S. & N.I. R.R.*, 68 U.S. 491, 510 (1864).

¹² *Autogiro*, 384 F.2d at 397-99, 155 USPQ at 702-04; *LaSalle v. Carlton's Laydown Serv., Inc.*, 680 F.2d 432, 216 USPQ 276 (5th Cir. 1982); *Studiengesellschaft Kohle mbH v. Eastman Kodak Co.*, 616 F.2d 1315, 206 USPQ 577 (5th Cir.), cert. denied, 449 U.S. 1014, 208 USPQ 88 (1980).

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disclosed or suggest-

Offset Plate, Inc., 720
USPQ 1137, 1140-41
v. United States, 384
Q 697, 702-04 (Ct. Cl.

Wahl, 724 F.2d 932,
5 n.5 (Fed. Cir. 1983);
3, 466 (1874); Turrill
R., 68 U.S. 491, 510

197-99, 155 USPQ at
Laydown Serv., Inc.,
276 (5th Cir. 1982);
H v. Eastman Kodak
USPQ 577 (5th Cir.)
208 USPQ 88 (1980).

ed to one of ordinary skill in the art the use of
override switching means in a television rental
system. The trial court's heavy reliance on
the widespread use of override switches ap-
pears to be no more than hindsight recon-
struction of the claimed invention. The court
below identified no source, other than the
Sonnenberg patent itself, for the suggestion to
use override switching means in a television
rental system.

[4] Obviousness cannot be established by
combining the teachings of the prior art to
produce the claimed invention, absent some
teaching or suggestion supporting the combi-
nation.¹³ Under section 103, teachings of ref-
erences can be combined *only* if there is some
suggestion or incentive to do so.¹⁴ The prior
art of record fails to provide any such sugges-
tion or incentive. Accordingly, we hold that
the court below erred as a matter of law in
concluding that the claimed invention would
have been obvious to one of ordinary skill in
the art under section 103.

Infringement

The trial court found that the Wells system
does not infringe the claimed invention, either
literally or under the doctrine of equivalents.
Once again adopting the testimony of Wells'
expert, the court below found that "the Wells
system does not contain the element of over-
riding a locked switch." The district court
also found differences between the ACS sys-
tem and the Wells device with respect to the
mechanism and circuitry of the actuating
switch as well as with respect to the indicator
light.

[5] These latter findings, however, will not
support a finding of no infringement. The
claims of the Sonnenberg patent are not limit-
ed to a specific switching mechanism or to
specific indicator light circuitry. The district
court appears to have compared the Wells

system with ACS's commercial product, rather
than with the claims of the Sonnenberg
patent. Infringement is determined on the
basis of the claims, not on the basis of a
comparison with the patentee's commercial
embodiment of the claimed invention.

[6] The district court's failure to supply
more comprehensive findings of fact com-
pounds the difficulty of appellate review, par-
ticularly in view of the complexity of the
technical subject matter of this appeal. Find-
ings of fact are to be construed liberally in
support of a judgment. Confined to the trial
court's limited findings, we are forced to draw
from the facts found those inferences that are
necessary to support the ultimate finding that
the Sonnenberg patent is not infringed by
Wells.¹⁵

In this endeavor we are not ourselves find-
ing those facts which the trial court failed to
set out for us. As an appellate court, we lack
the power to perform that exercise. Where
the trial court fails to make findings, the
judgment will normally be vacated and the
action remanded for appropriate findings to
be made.¹⁶ Where a full understanding may
be had without the aid of separate findings,
however, we recognize a narrow exception to
that general rule.¹⁷

The ultimate finding of fact in a case,
whether initially by the trial court, or as
affirmed on appeal, rests on the same under-
pinnings, i.e., the necessary subsidiary facts,
supported by evidence of record, that lead to
that ultimate finding. Where the district court
has not misapplied the controlling legal stan-
dards in its evaluation of the evidence, its
ultimate finding as well as the subsidiary
findings upon which the ultimate finding nec-
essarily depends, is subject to review on ap-
peal under the clearly erroneous standard of
Fed.R.Civ.P. 52(a).¹⁸ We examine the record
in order to review the trial court's judgment,
and the findings it made or necessarily had to
have made to support that judgment and,
thus, to conclude the controversy at this stage
without unnecessary further expenditure of
judicial resources, if possible.

The Sonnenberg Claims.

The Sonnenberg patent claims a rental
television system having key operated actuat-

¹⁰ Orthopedic Equip. Co., 702 F.2d at 1012, 217
USPQ at 199; cf. *In re Samour*, 571 F.2d 559, 563,
197 USPQ 1, 4 (CCPA 1978) (noting the rule in
the §103 context and declining to extend that rule
to §102(b) rejections); *Corometrics Medical Sys.,
Inc. v. Berkeley Bio-Engineering, Inc.*, 193 USPQ
467, 475 (N.D. Cal. 1977).

¹¹ *In re Rinehart*, 531 F.2d 1048, 189 USPQ
143 (CCPA 1976); *In re Regel*, 526 F.2d 1399, 188
USPQ 136 (CCPA 1975); *In re Avery*, 518 F.2d
1228, 186 USPQ 161 (CCPA 1975); *In re Imper-
ato*, 486 F.2d 585, 179 USPQ 730 (CCPA 1973);
In re Andre, 341 F.2d 304, 144 USPQ 497 (CCPA
1965).

¹² 5A J. MOORE, J. LUCAS, MOORE'S
FEDERAL PRACTICE §52.06[1] (2d ed. 1984).

¹³ *Pullman-Standard v. Swint*, 456 U.S. 273,
292 n.22 (1982); 5A MOORE'S FEDERAL
PRACTICE §52.06[2].

¹⁴ See 5A MOORE'S FEDERAL PRACTICE
§52.06[2] n.4 and cases cited therein.

¹⁵ Cf. *Pullman-Standard*, 456 U.S. 273.

ing means capable of being overridden by an override switching means. An indicating means signals that the override switching means has been actuated. Once overridden, the switches and the indicator light remain in their overridden positions until the key operated switch is switched on, resetting the override switching and indicating means.

The Accused Infringing Device.

The Wells device also contains each of the three physical elements of claims 1 of the Sonnenberg patent: (1) a key operated actuating switch; (2) a remote control actuating switch; and (3) an indicator light. The district court, however, found that the Wells device does not contain the claimed limitation of overriding a locked switch — a difference in function.

The Wells device is a modified version of a standard hospital/hotel/motel television receiver. The keylock in the Wells system actuates 5 switches: S1XA; S1XB; S1B; S1C; and S1D [Fig. 1].

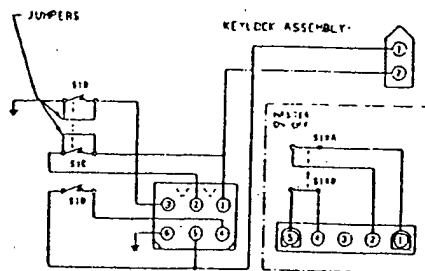


Fig. 1
Wells Device
Keylock Assembly As Manufactured

In the Wells device, the jumper wires, provided by the manufacturer on switches S1B and S1C, are not removed. [Fig. 2.]

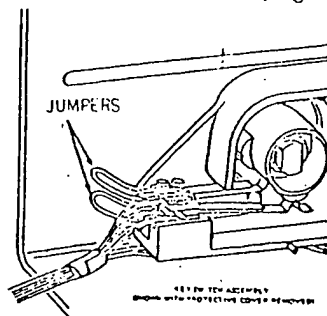


Fig. 2
Wells Device
Rest of Key Switch Showing Jumpers

Switches S1B and S1C are shorted out by those jumper wires, rendering those switches electrically inoperable.

Additionally, switch S1D [Fig. 1] is "replaced" by relay RL-2 [Fig. 3] of the Wells remote control circuit.

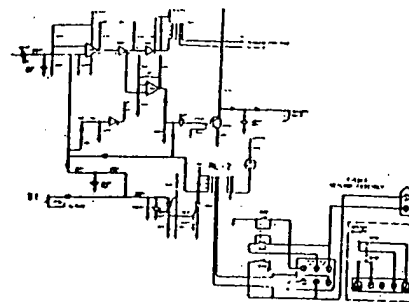


Fig. 3
Wells Device
Schematic of Remote Control
and Key Switch Assembly

Relay RL-2 is connected in parallel with switch S1D and one of the leads to switch S1D is cut between switch S1D and the connection of the lead to relay RL-2 [Fig. 3]. Thus, the circuit through switch S1D is broken, rendering that switch electrically inoperable.

Unlike switch S1D which it replaces, relay RL-2 is not controlled by the key switch. Rather, switch S1 [Fig. 3], located on the remote control unit, operates relay RL-2 in the Wells device. When S1 is not depressed, relay RL-2 remains normally closed. When switch S1 is depressed, the coil in relay RL-2 is energized causing relay RL-2 to open. Similarly, switch S1D, which relay RL-2 replaces, was normally closed when the television was not rented and was opened by turning the key switch to rent the television.

Switches S1B, S1C, and S1D, therefore, are disabled in the Wells device. The key switch operates only two switches — S1XA and S1XB [Fig. 1] — which control the delivery of power to the television receiver. When these switches are closed [positions 2

are shorted out by
luring those switches

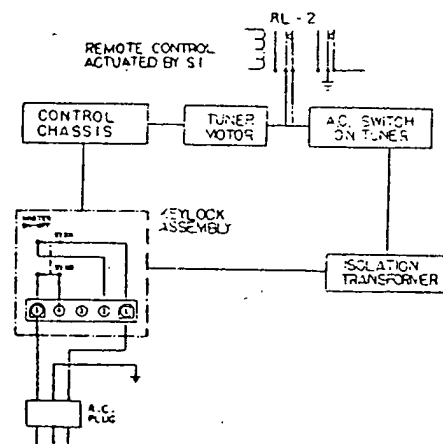
1D [Fig. 1] is "re-
Fig. 3] of the Wells

and 3] [Table 1], power is delivered to the
tuner; when these switches are open [position
1] [Table 1], the circuit is broken and no
power reaches the tuner.

the Wells device.²⁰ Switch S1 and the key
switch are electrically independent in the
Wells device [Fig. 4].

KEY SWITCH & PROGRAMMING T2B POSITION TABLE									
AS MANUFACTURED									
KEY	FUNCTION	SWITCHES	SWITCHES	PROGRAMMING	CONTROL	CONTROL	CONTROL	CONTROL	CONTROL
1	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP
2	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP
3	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP	STOP

Table 1

Fig. 4
Wells Device
A.C. Switching

As manufactured, when the key switch of a standard receiver is in position 2 [Table 1], switch S1D is open and the television operates normally. Position 2 functions as an "on" setting in the standard receiver. In the Wells device, however, switch S1D [Table 1] has been disconnected and it has been replaced by relay RL-2. Relay RL-2 cannot be opened by manipulation of the key switch, as was switch S1D. Thus, the receiver cannot be actuated merely by turning the key switch to position 2 in the Wells device.¹⁹ Switch S1 opens relay RL-2. The Wells receiver can be made fully operable only by depressing switch S1 [Fig. 3] while master on-off switches S1XA and S1XB are closed — position 2 or 3 [Table 1].

When the key switch is in position 1, power is interrupted and depressing actuating switch S1 will not actuate the receiver. The Wells key switch performs the same function in position 2 as in position 3. In both of these positions, while power is supplied to the tuner, the actuating switch S1 must be depressed in order to actuate the television. Thus, switch S1 does not override the key switch of

In summary, the Wells device exhibits three modes of operation: (1) off — locked out (switches S1XA and S1XB open); (2) rentable — key position 2 or 3 and S1 not actuated (switches S1XA and S1XB closed and switch S1 open); and (3) rented — key position 2 or 3 and S1 actuated (switches S1XA and S1XB closed and switch S1 closed). Normal operation of the Wells device can be achieved only by depressing S1 while the power is switched on (key switch position 2 or 3). The invention claimed in the Sonnenberg patent, on the other hand, also exhibits three modes of operation: (1) "off" — rentable (override switch not actuated); (2) "On" — rented (override switch actuated); and (3) "on" — key operation (key switch turned on and override switch not actuated).

On the basis of our examination of the record we infer that the district court neces-

²⁰ Our assessment of the operation of the Wells device is based on the trial court's findings and on the documentary and testimonial evidence of record. It appears that only switches S1XA and S1XB are controlled by the key switch. Thus, our analysis supports the trial judge's implication that there is no functional difference between positions 2 and 3 of the key switch. The above analysis assumes that the key switch does not operate some third circuit that is actuated in either position 2 or position 3, but not both. We are aware of no evidence that such a third circuit fulfills the role of the key switch and is in turn overridden by switch S1.

¹⁹ It appears that had RL-2 and S1D been wired in series, instead of in parallel with S1D disabled, the Wells device would exhibit the claimed "on" function.

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